FRD ACTIVITIES REPORT
July 2007

Research Programs

Urban Dispersion Program

The manuscript "Atmospheric Flow Decoupling and its Effects on Urban Plume Dispersion" is still under review at the journal Boundary Layer Meteorology. The manuscript "Plume Dispersion Anomalies in a Nocturnal Urban Boundary Layer in Complex Terrain" is still undergoing ARL review. A draft manuscript "Probability Density Functions and Peak-to-Mean Ratios for Tracer Plumes in an Urban Boundary Layer" has been completed and is presently undergoing internal FRD review. This manuscript contains some material leftover from the first paper listed above and incorporates some new material from Joint Urban 2003. One key finding was that peak-to-mean values, while usually less than five, were commonly as high as 5-10 and ranged upward as high as 58.3. It was also found that probability distributions ranged from strongly positively skewed near the margins of the plume or close to the source to only weakly skewed in the more well-mixed portions of the plume at greater distances from the source during the nighttime. These results have implications for assessing the hazards posed by toxic airborne releases and offer guidance for the development of urban dispersion models. (Dennis Finn, 208-526-0566)

Perfluorocarbon Tracer Analysis Development

The 250, 4000, and 100,000 pptv sample stability tests continued. These tests have been in progress for 6 months now and the data still indicate that sample deterioration is minimal. We are still trying to resolve some chromatogram interference issues for PDCB at lower pptv levels. (Dennis Finn, 208-526-0566, and Roger Carter)

Cooperative Research with DOE NE-ID (Idaho National Laboratory)

Emergency Operations Center (EOC)

A large wildfire broke out on the East Butte of the INL the evening of 18 July. The EOC was activated shortly after it was first discovered and remained operational for 26 hours. The blaze was brought under control on the evening of 19 July after burning 9,436 acres. The cause of the blaze is still being investigated. FRD provided timely short range forecasts to EOC personnel during the activation. (Jason Rich, 208-526-9513, Brad Reese, Rick Eckman, and Neil Hukari)

A drill was held at the EOC during the morning of 18 July. It was a lead-up to the Annual Exercise that is scheduled for 14 August. By coincidence, this drill took place on the same day as the large wildfire that caused the EOC to be activated later in the day (see above). Wednesdays

also happen to be when the EOC teams are rotated, so the FRD staff that participated in the drill were not the same as those who initially responded to the fire. (Richard Eckman, 526-2740, and Randy Johnson)

ANSI /ANS-3.11-2005 Deficiencies

The criteria for gathering and assembling meteorological information at the Department of Energy nuclear facilities are contained in the document ANSI/ANS-3.11-2005. It was found during the 2004 Assist Team Visit from the DOE Meteorological Council that 22 out of the 23 objectives in the ANSI-ANS-3.11 guide were being met. The only objective not being met involved using the root mean square methodology in determining the total system accuracy. This deficiency is now being addressed. A document describing all of the end to end errors and the associated root-mean-square error for each instrument in the meteorological data gathering system is being developed. In conjunction with this effort, modifications necessary to bring the existing "Semiannual Calibration and Maintenance Form" into compliance with ANSI/ANS-3.11 requirements are being implemented. (Randy Johnson, 208-526-2129)

INL Climatology

The 3rd Edition of the INL Climatology is again in preparation. NOAA INL Mesonet data in the new climatology will be updated through March of 2007. The 3rd Edition will be useful to planners and operations staff that support the INL and to the general public. (Jason Rich, 208-526-9513, and Neil Hukari).

Transport and Dispersion Modeling

FRD has continued its discussions with other ARL divisions and the CAMEO/ALOHA group within the National Ocean Service on improving HYSPLIT for local dispersion applications. Since both FRD and SORD have large mesonets, one of the main required improvements is a method of deriving a local 3D wind field that takes full advantage of these mesonets. One possibility is to use the NOAA Local Analysis and Prediction System (LAPS) to blend local observations with a 3D background wind field derived from a numerical forecast model. A copy of LAPS was obtained at FRD, but it was quickly determined that it is difficult to use. The main problem appears to be that LAPS is tightly integrated with other applications running at ESRL; other users have to duplicate the functionality of these other applications, which can be highly time consuming. Focus has now shifted to the WRF-Var system that is available as part of the overall WRF development effort. WRF-Var is a variational data assimilation system that can handle many of the same data inputs as LAPS. It has the advantage of being directly compatible with the existing WRF configuration at FRD. In addition, the NOAA Meteorological Assimilation Data Ingest System (MADIS) appears to provide utilities that convert observations from its database into a format compatible with WRF-Var. (Richard Eckman, 526-2740)

The 2006 annual dispersion estimates for the INL were completed in the first week of July. These model estimates are used to estimate possible exposures to individuals living in the area surrounding INL, and the results go into the annual site environmental report. (Richard Eckman, 526-2740)

Collaborative Research

A manuscript commenting on a recent paper published in *Boundary Layer Meteorology* has been submitted for ARL review using the new electronic submission process. It deals with the effects of time averaging on the computed value of the integral time scale. (Richard Eckman, 526-2740)

Other Activities

Papers

Finn, D., K.L. Clawson, R.G. Carter, J.D. Rich, C. Biltoft, K.J. Allwine, J.E. Flaherty, and M.J. Leach, 2007: Analysis of Plume Dispersion, Decay, and Peak-to-Mean Excursions for Continuous Tracer Gas Releases in an Urban Core, Oklahoma City, JU2003. (Submitted to Boundary Layer Meteorology)

Finn, D., K.L. Clawson, R.G. Carter, J.D. Rich, K.J. Allwine, and J.E. Flaherty, 2007: Analysis of Plume Dispersion in a Nocturnal Urban Boundary Layer in Complex Terrain, Salt Lake City, URBAN 2000. (Submitted for ARL Review)

Finn, D., K.L. Clawson, R.G. Carter, J.D. Rich, C. Biltoft, K.J. Allwine, J.E. Flaherty, and M.J. Leach, 2007: Atmospheric Flow Decoupling and Its Effects on Urban Plume Dispersion. Extended Abstract, Seventh Symposium on the Urban Environment (FRD Review)

Safety

FRD received the official findings of the Assistance Site Survey June 25th safety inspection conducted by NOAA MASC Safety and Environmental Office. We received one noteworthy practice: housekeeping at the facility has greatly improved since the last inspection some 5 years ago. The eight minor findings from the safety inspection and the associated corrective actions are listed below.

1. Lack of approved tower fall protection training for electronic technicians - An approved training course was completed on 30-31 July.
2. Lack of approved forklift operator training - Training of forklift operators is scheduled in August.
3. Extension cord not plugged into an approved receptacle - Correction is pending.
4. Electrical outlet missing faceplate - Faceplate has been installed.
5. An extension cord was found running over a wall through the ceiling - Extension cord was removed.
6. Fan in operation without a guard - Correction is pending.
7. No access to electrical panel - Area has been cleared 3 ft around the panel.
8. Drill press in not anchored to floor - Correction is pending.

Travel

Kirk Clawson traveled to Fairfax, VA July 9-13, 2007 to attend the GMU Atmospheric Transport and Dispersion Modeling Conference and to visit with the new ARL Director, Steven Fine.

Donna Harris attend the annual AO Management Conference in Norman, OK on July 16-20, 2007.

Training

Tom Strong and Shane Beard attended ComTrain Tower Safety & Rescue Training in Boise on July 30-31, 2007. This satisfies the requirements from our safety inspection in June 2007.

Misc.

In July 2007 FRD donated 5 used nephelometers to the Commission for Environmental Cooperation to be used in Mexico.